THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. II.] Copyright, 1876, JAMES R. OSGOOD & CO. [NO. 87.

BOSTON, AUGUST 25, 1877.

CONTENTS.

SUMMARY:—
The Crime of Murderous Building.—Supervision of the Construction of Audience Buildings.—Building Associations.—A Mission for Architecture in the Cities.—The Jetties at the Mouth of the Mississippi.—How to create an Atmosphere for High Art.—Our Abuse of Boldness in Design.—Our Characteristic Want of Study 269
M. BEULÉ ON GREEK POLYCHROMY. I. 271
THE SEWERAGE OF BOSTON. II. 272
THE ILLUSTRATIONS:—
Young Men's Christian Association Building at Philadelphia.—Chapel at Englewood, N.J.—Gross St. Martin at Cologne 273
CORRESPONDENCE:—
Letter from Philadelphia.—Letter from Baltimore 273
COMMUNICATIONS:—
Architectural Dictionaries.—Black Mortar.—Masonic Temple at New Haven 274
THE CATACOMBS 275
NOTES AND CLIPPINGS 276

THE late burning of Pelstring's cigar-box factory at Cincinnati, by which six or seven unhappy operatives, male and female, lost their lives, has compelled the authorities to make a careful examination of manufacturing establishments in that city. We learn that thirteen out of twenty-nine examined have been pronounced dangerous through want of proper exits for the working-people employed in them. The owners of the condemned buildings have been required to furnish what are considered sufficient means of safety in case of fire. Those who in a spirit of common humanity had provided adequate egress, or with common prudence had built walls which would stand up, received an honorable mention. It is the old story. In the cigar-box factory there was but one narrow staircase, which the fire instantly rendered unavailable. The poor creatures who were caught in this vile trap perished miserably by fire, or were crushed by the speedy falling of the cheap walls; thirty minutes were sufficient to accomplish the whole business. Laws which are made to secure good building are unfortunately applicable, as we have lately intimated, only to large cities, and are enacted and applied only after such cities have become large. We shall probably never know, notwithstanding all our official inspections and our retro-active measures, what insufficient structures yet remain even in our best administered municipalities, until calamity in due time points them out. "It must needs be that offences come, but woe to that man by whom the offence cometh." If grave penalties were really enforced against the owners and builders of such structures, so that peril or destruction of life by reason of their imperfections in any respect should be regarded as *a crime* to be punished by fine and imprisonment, as in Paris, we should, so far at least as the great cities are concerned, have less cause painfully to reiterate in these pages these sad tales of disasters, and less reason to enjoin upon the public the use of common sense, common honesty, and common prudence in the necessary art of building.

IN England the House of Commons early in the present session, aroused by the Brooklyn tragedy, appointed a select committee to inquire into the most efficient mode of providing for the security from loss of life and property in the Metropolis, especially in reference to theatres and places of amusement. Heretofore the control of the authorities over theatres and concert halls has in the absence of definite laws been exercised apparently rather as a matter of propriety than as a matter of duty, and it has been conceded by the proprietors as a matter of expediency. The authorities have thus been enabled rather to suggest than to exact provisions of safety. As regards the construction of such buildings the system of supervision as required by the Buildings Act has not in practice been found to result satisfactorily, as the district surveyors, who act as inspectors and to whose discretion the interpretation of the law is intrusted, do not seem to agree as to its meaning, and materially differ in respect to what constitutes fire-proof material, so that there is no recognized standard of requirements and no adequate assurance of safety. The supervision by subordinate officers having been found insufficient, the committee now propose that this duty shall be discharged directly by the Metropolitan Board of Works acting on their own responsibility, after receiving such professional advice as they may think expedient in each case. The committee does not attempt to determine what structural conditions and arrangements are best to meet the danger of fire and panic, but leaves them to be settled by experts. It however suggests the isolation of such buildings by spaces or fire-walls, the subdivision of risk by fire-proof partitions within, certain distributions of rooms to minimize the risk, numerous and separate methods of egress, passages widening and doors opening outward, avoidance of steps in passages, hydrants and hose so disposed as to command all parts of the building outside and in. Our own laws are so framed as practically to throw upon the inspectors the entire responsibility as to the construction of audience buildings; and as each inspector may have his own standard of safety, and as each may differ from the rest in regard to what constitutes risk, the public do not seem to have the requisite assurance of safety, and seem to be at the mercy of the personal opinions of the official, which may or may not be sufficiently exacting. If he requires what the proprietor thinks too much, there is an appeal provided; but if he does not require enough, the public are not likely to know it until too late. The proposition of the committee of Parliament therefore is worth considering here. The responsibility, where discretionary power is allowed, should be placed as conspicuously as possible, and strengthened by any professional or expert advice required.

WE are glad to hear that Co-operative Saving Fund and Loan Associations, otherwise known as Building Associations (see p. 253), are at last taking definite form with good prospects of success in and about Boston. The testimony in favor of these useful societies multiplies in every part of the country. The Trenton *Gazette* reports that they have done more towards building up that city than any one cause. In Chicago their direct and indirect effect upon the increase of independent homes has been hardly less important than in Philadelphia; under the care of such wise capitalists and sound political economists as Mr. Sidney Myers of that city, there has been erected a class of model houses which we hope presently to be in position to illustrate in these pages, as a record of vital interest to our civilization, and we hope to our art. Architecture will not have vindicated its position and usefulness in this country, until it has given to these great enterprises the benefit of its most earnest assistance.

HITHERTO the main obstacle to the erection of independent homes for the working people in Boston has been the high price of land occasioned by the peculiar geographical position of the city. But now the crowded peninsula has been connected with the main land by extensive fillings on both sides of the original Neck, and the city limits have been widely extended, so as to embrace large districts on the main land in the vicinity, connected with the centre by rails for steam and horse cars, and enjoying all the advantages of municipal care, as is also the case with our insular neighbor of New York, whose boundaries, as we explained on our p. 230, now include extensive and accessible building regions northward on the main land. The conditions are thus materially changed; and the problem of improving the condition of the poor by conferring upon them the comfort and respectability of independent homes, so successfully solved in Philadelphia, Chicago, and elsewhere, may be regarded as fairly open for study in Boston and New York. We have now before us a map of the property of the Metropolitan Land Company, on the Boston and Providence Railroad of Boston, including, we believe, an area of some seven or eight million feet adjoining the old southern boundary of the city, and extending into the district known as Hyde Park, formerly in West Roxbury. This

region has been laid out in streets and avenues, and subdivided into "blocks." These streets are not always straight, or at right angles, and are therefore we hope fairly and reasonably adjusted to the natural surface of the land. These "blocks" are now selling at public auction, and at the date of this writing, the prices brought range from one cent and less to five cents per foot. Forty per cent of the purchase money is to be paid in cash, and the remainder is secured by a five per cent mortgage note, payable in three years. The opportunity for the application of the Philadelphia or Chicago building systems seems to be clearly presented, and we commend it to the careful attention of all those interested in the welfare of the working people. There seems to be no longer a reason why either in New York or Boston the teeming population should be hived in high tenement houses, or be crowded in squalid lanes, there to be kept low and degraded by evil contact. In such places as this demagogues and communists under various disguises recruit their forces against civilization. To purify these places, and to transfer to new and healthy regions their dangerous overplus of population, constitute a measure in the interests of morality, good government, and public safety. Capital, as we have repeatedly intimated, cannot be more wisely and safely employed than in assisting this important movement in all our great cities; and architecture, combined with capital in this mission, can give to it an efficiency not otherwise to be obtained.

Capt. M. R. Brown of the United States Engineer Corps, who has been charged with the duty of inspecting the progress of the interesting work carried on by Mr. James B. Eads, C.E., at the South Pass of the Mississippi, with the object of so deepening the channel as to admit ships of heavy tonnage to the navigation of the river, has made a favorable official report. He states that the mattress work sunk with stone, so as to form continuous jetties on either side of the main mouth or pass, has by the more efficient scour thus obtained increased the depth of the river to at least twenty feet along the whole length of the jetties, with the exception of a shallow strip 140 feet long. This bar, which seems to be gradually yielding to the wash, is the only obstruction now remaining to the passage of ships drawing twenty feet of water. The bars at the mouth of the river, and outside the present limits of the jetties, are receding under the same process; and a careful comparison of the present condition of the gulf bottom outside the delta, with that according to previous surveys, indicates a slight average increase over the area investigated. According to this report, more than a million and a half cubic yards of sediment have been carried out to sea from the river bottom between the jetties, within the last four months. This is a better result than we had reason to expect when we last referred to this important enterprise, just a year ago.

The New York *Times* complains that academies of art offer to art in a high sense but an indirect and questionable encouragement. It admits that they do succeed in educating a large number of young people up to a point of efficiency in processes that have a certain money value in the market, such as the designing of furniture and interior decorations of all kinds, patterns for stuffs, modelling in clay for the potter, painting on porcelain, tiles, and the like; but considers, on the other hand, that their services stop here. We are hardly prepared to say that there can be no high art without academies and schools of this sort, but it cannot be questioned that they do spread abroad, as no other institutions can, a feeling for art, a sensitiveness to concrete expressions of beauty, that they do encourage, inform, and refine minds so that they are capable of appreciating, enjoying, and making beautiful things; that they do in this manner create an atmosphere eminently favorable to the existence of high art, if not directly productive of it, — an atmosphere in which it would be impossible for one to say, as John Adams wrote in 1819, "I would not give a sixpence for a picture of Raphael or a statue of Phidias." It has been said that Greek art was possible because the whole Greek people were critics. Ictinus himself could hardly flourish among California gold-diggers. The people who have been trained up to a degree of susceptibility to ideas of art are, of course, the most intelligent patrons and critics of art. We all know that in such a state of society, a high standard of architecture, sculpture, and painting is possible and probable; and, if there anywhere exists latent genius, the chance for its discovery and for its development to the extent of its capacity is infinitely increased. If we take care of the pennies, the pounds will take care of themselves; if we take care of our minor industrial manufactures, and breathe into them the life of art, high art will come in due time. Let us, then, continue to study ornamentation, and improve the design of our needle-work, of our cotton prints and woollen fabrics, of our carpets and wall-papers, of our pots and shovels and tongs; for by such humble paths we shall in due time penetrate to the higher regions of pictured friezes and wall-paintings, of statuary in marble and bronze, and of architecture, in fine, illustrated and completed by all the arts.

The English *Architect* of Aug. 4 opens with an article inspired by the criticisms of Mr. Cave Thomas, on the series of "two-hour studies" done by Mr. Legros before the astonished students of the Slade class, in London, and presented by that artist to the South Kensington Museum. Mr. Thomas, as an artist and a teacher, stigmatizes these clever, hasty sketches, as dangerous and corrupting; encouraging the already too prevalent tendency to "bombast," to "boldness which is synonymous with impudence," and to "the very braggadacio and impertinence of art." Of course the attraction of the results of rapid workmanship, the peculiar charm of the accidental effects in the first rough sketch of a design, whether in the quick black-and-white dash of the painter fired with an idea, or in the rough thumb-work of the small clay model of the sculptor, or in the tentative studies of the architect as he first throws his masses together with a free hand, — these attractions and charms must be recognized as a part of the experience of every person capable of artistic feeling. But when this sketching professes to accomplish finished art without labor, the critic considers that it is baneful to the artist and to art. The boldness which comes of masterly experience and knowledge is a very different quality from that of youthful self-confidence and enthusiasm, or from that courage which is born of the joy of exercising a newly discovered knack or faculty of expression in drawing. This latter quality we must recognize as a prevailing characteristic among our young architectural draughtsmen in especial. It too often takes the place of that *correctness* which comes of patient study and deliberate care, and which is the only proper basis of education in architecture and the other fine arts, as well as in the exact sciences. Young men have no right to presuppose that they are the favorites of fortune, and possess that inborn genius to which study and slow acquisition are unnecessary. There is no royal road to success.

First *correctness, then boldness.* This seems to be the true watchword of the student of art. In our own country, great and venerable monuments and the works of acknowledged masters are not everywhere present, to establish a standard of execution, and to enforce modesty and precision of workmanship on the part of the aspirant. The student who has conquered the first feebleness and indecision of his drawing, at the first opportunity rushes in where angels fear to tread. Our highways and byways therefore are crowded with unstudied and illiterate work, in which knack takes the place of knowledge, and crudity that of correctness. As regards the case in England, our contemporary the *Architect*, alluding, we may suppose, to some of the unconsidered and barbarous work fostered there by the Queen Anne revival, and by the picturesque license of the new mediævalism, says, "In fact, we may here acknowledge without further words that there is a good deal of the boldness which is impertinence, prevalent in England just now, as the direct result of youthful ambition failing to be satisfied in youth, and in a certain measure as the consequence also of the confused condition into which architectural criticism has been brought, chiefly by the vagaries of amateur prophets." Experience proves to us that the establishment of an academic standard by high education is the only means by which boldness and courage in design can be properly subordinated to correctness and precision. The *École des Beaux-Arts* for two centuries has preserved the architecture of France from the illiterateness and superficiality under which we suffer in too many places in this country.

The obvious duty of those who would raise the standard of architecture, therefore, is to establish schools, in which the superabundant courage of our youth is made to understand and respect principles of art, and the true value of precedent, before it ventures on the dangerous ground of invention and originality. Our own pages, which have hitherto undertaken to set forth within the limits of our opportunities, the higher average of contemporary design, are proofs too often of our need of educated perceptions and of that true strength of the artist which is best expressed in its reserve. We pray that this historical record may be speedily improved for the sake of our good name.

M. BEULÉ ON GREEK POLYCHROMY. — I.

[THE question of the coloring of Greek architecture is always an attractive one, and our readers may find interest in the following extracts, which we have been tempted to translate and partially condense from M. Beulé's *History of Greek Art before Pericles*, because although they are not entirely new, they give perhaps as good a *résumé* of the subject as can be found, and his book is probably not familiar to most of those who will see them here.]

The question of polychromy, or of color applied to monuments, is a modern question, which dates rather from our century than from the generation which preceded us. It is scarcely fifty years since traces of color were noticed on the temples of Greece, and we found that a system which we at first thought was confined to Herculaneum and Pompeii must be ascribed to all antiquity. Those who observed patches of color on Greek monuments asked if they were to be attributed to chance, to the barbarism of primitive times or of a later time, or to principles fixed and formulated by Greek genius. Our surprise had to give way to a patient systematic study, eager to comprehend all the aspects of ancient art, and to conform itself by force of imagination to all its customs. Moreover, these customs are beauties which are to be enjoyed with the greater effort in proportion as they are opposed to those which our contemporaries admire. The natural introduction to the subject is by presenting an historical summary of the question. . . .

It was in 1824 that Hittorf, after exploring the monuments of Selinus, Agrigentum, Syracuse, and Acra, returned to Rome convinced that painting as well as sculpture had contributed to the decoration of the Greek temples, so that the three branches of art had combined their processes and their various science in pursuit of a single end and a more magnificent effect. Returning from his travel, Hittorf stopped at Rome, and found in the Eternal City the sculptures of Ægina, which Thorwaldsen was restoring. The colors of which these statues still bore noteworthy traces agreed curiously with the results announced by Hittorf. Both sculpture and architecture showed themselves at once in a new aspect, and lent each other a mutual support. In April, 1830, Hittorf read before the Academy of the Fine Arts an essay which was afterwards developed into the work entitled, *The Restoration of the Temple of Empedocles at Selinus, or Painted Architecture among the Greeks.* In this work are to be found collated the texts which relate to color as applied to Greek monuments, the discussions suggested by these problems and all the partial problems which attach to them; and moreover all the indications furnished the author by ruins, vases, terra-cottas, paintings, and sculptured monuments. It is, I repeat, a body of proof in support of a vast and absolute system. A temple of Selinus, that which Hittorf calls the Temple of Empedocles, is the type in which are embodied the various characteristies of polychromy: it is their symbol.

Naturally three theories have been suggested: one which rejects color, another which accepts it without reserve, a third which accepts it with limitations, — the system of mixed polychromy. The theory which rejects color is nowadays abandoned. It is impossible any longer to accuse the Romans, Byzantines, or Arabs of having painted the Greek edifices. So many facts have come to light on every side, proofs so incontestible, that the theory must be given up, at least unless one would do as did a famous *savant*, who, while travelling, turned away his eyes from the places where color was shown him, that he might maintain his freedom of opinion. People have intrenched themselves behind æsthetic considerations, and asked how the ancients could have so marred the whiteness of their marbles. We shall come back hereafter to the question of taste: here the question is simply one of fact. The fact is, that color is found on Greek monuments at Pæstum as in Sicily, in Sicily as in Greece, on great monuments as well as small, on tombs as well as temples. This is why there is no longer any quarrel except between mixed polychromy and absolute polychromy. Was their color everywhere? or was it only the ornaments, the mouldings, and the upper parts of buildings that were decorated? Did color spread its brilliancy, its contrast, its harmony, over the whole monument, or was it only an auxiliary?

The ancients, in speaking of their monuments, describe neither their aspect nor the character of their details. It has been easy, therefore, to contest the indications of the few words which their authors let fall here and there. Vitruvius, speaking of triglyphs, asserts that they originally represented the extremities of the beams that bore upon the architrave. These extremities were covered with boards coated with blue wax. The objection is made that nothing was more natural in wooden temples, but that this was not applicable to stone temples. There were at Athens, says Pausanias, the red and the blue tribunes. This was an exception, is the answer, a freak, just as the ten tribunes at Athens were designated by ten letters of the alphabet. On the walls of the temple at Olympia, and on a stele found near a temple of Minerva at Eubœa, was a coating of milk and saffron, which when rubbed by the finger, centuries after, preserved not only the odor but the taste of saffron. The partition wall around the Jupiter Olympius of Phidias was painted blue. These were also taken to be exceptions, and, for that matter, Pompeii and the tombs had long familiarized our minds with painted interior decoration. The question was of great edifices and of façades. Vitruvius speaks of porticos painted with minium. But these porticos belonged to his time; and he himself in another passage cites minium as a color which is dear and difficult to apply. As for the painted imitations of veined marbles, of which Pliny speaks, it was only a fashion introduced under the emperor Claudius.

Thus the texts were open to objection. It was a good deal, nevertheless, to have found some which furnished precedent and moral support. But the discoveries which followed, one after another, in different parts of the Greek world, gave the theory of polychromy a much stronger support. Stones, in fact, bear testimony no less eloquent than that of manuscripts. It became impossible for the advocates of mixed polychromy to ignore the color which was found on the different parts of temples, one after another. The columns of Metapontus and Ægina were covered with yellow stucco; the capital of Pæstum bore traces of painted honeysuckle; the architrave at Ægina was painted, as were friezes and cornices in all countries; the walls of the Theseum and the temple at Ægina bore marks of color; the very floor was painted at Ægina and Selinus.

But recourse has been had to an argument which it is more difficult to refute: the difference of materials has been alleged, — the difference between white marble and stone. Granted that stone was painted; or covered with stucco, and the stucco painted. But buildings of white marble, the splendid marble of Pentelicus, the Parian, brought at great cost to Delphi and Siphnos, — were they to disappear under a coat of paint? Is not the contrary proved by the fastidiousness which ruled over the drums of the columns of the Parthenon, and which rejected enormous blocks because a greenish stain marred their brilliancy? . . .

But, reply the advocates of absolute polychromy, we only claim for the marble columns a tender, pale tint, hardly a coating to hide their texture; a little Punic wax rubbed on with the aid of heat, and permeating by the effect of expansion the pores of the fresh-cut marble. Some ancient sculptors treated their marble statues thus, making their color less crude, softer and creamy, like old ivory; letting the splendor of the marble shine through while it harmonized it with the whole effect of color. Moreover, your white marble would soon change with the effect of sun and rain; it would be gnawed by the salt wind from the sea; it would gather moss on the side of the north wind, which is the winter wind. Then you would have nothing left but chance color, deterioration, a picturesque dinginess; and meanwhile you would retouch the painted portions, which would remain bright and ever young. Can we admit this? To which the advocates of

mixed polychromy reply that the surface of marble may be protected, and made insensible to the action of weather, by encaustic appliances, without changing its whiteness. Thus the two camps are pitched at last but a very short distance apart. A tint more or less pale, a question of material which touches but very few monuments (for marble temples are rare in Greece); but for these they would agree: the facts allow no greater disagreement.

It has been said that by virtue of hieratic tradition, that is to say, by respect for religion and under its jealous oversight, the decoration of its temples was scrupulously copied from age to age. Colors had their places, their religious signification. "Red and blue," says Stackelberg, "were sacred colors, as they were in Egypt." The Chevalier Brönsted has since carried these assertions much farther: it would then have been impiety to alter not merely the painted ornaments, but even their arrangement. This theory was accepted at a time when Egypt, just explored by the French expedition, was engaging every one's attention. It had become a habit to subordinate Greece to Egypt, as a province to its capital. Greek art, architecture, sculpture, and painting, was all derived from Egypt. Now in Egypt art was hereditary, — it was so believed, at least; religion ruled and enslaved art. Although the progress of knowledge has reduced this theory to its due limits it has left its mark. Its influence in disguise has its effect on some of our ideas, and such ideas are opposed to the true Greek spirit.

What constitutes the grandeur of Greek genius, and has made it the noblest representative, the essence and model of humanity, is its free development. It broke through this hieratic tradition, which is mere immobility, to create an admirable tradition which is progress, continual advance, the pursuit of infinite beauty and perfection. The word hieratic can be applied only to the primitive epochs of Greek art, for the sacerdotal principle or clerical domination had ceased to exist at the beginning of historical times. The sacerdotal castes had lost their importance, and even the civilization of Homer shows the spiritual power confiscated by the temporal power. In the midst of innumerable divinities and temples of unequal celebrity, and of mythological anarchy, when religion was only an external thing, when what it reverenced was a form, and for the multitude only a form, art was no longer a slave, but a master. This it was that built temples and made gods.

In respect of art, and especially of Greek art, I believe in only one theory, the theory of epochs, because it is just this that analyzes Greek genius in all its developments, and follows its slow transformations, noting from time to time a period of rest, the better to bring out its progress and differences. The theory of epochs is applicable to every thing, and should be applied to every thing, for history itself guides knowledge by its means, and the logic of facts has a force far beyond that of our complaisant systems. We should then apply to polychromy the same method that we apply to all the questions of Greek art, — we should study it by epochs.

While the orders of architecture succeeded one another in public favor; while their proportions were changing and improving continually; while the sculpture of pediments and friezes was in modification, and the forms of architecture becoming finer or more exquisite, its lines purer or softer, its profiling more harmonious or harsher, its details disappearing to give way to others; while, in a word, every thing was in transformation, from the column of Corinth to the Doric column of Pompeii, we have the right to ask if painting alone — I mean painted decoration — escapes this law of progress, so rigorous and so logical even in decadence. Thus far the existence of polychromy has been demonstrated. There remains a more difficult work which our age can, as yet, only sketch out: it is to recover its history.

THE SEWERAGE OF BOSTON.[1] — II.

If a city built of wood were subject to frequent outbreaks of local fires, its government would hardly hope to avert the danger by putting up fire-proof buildings in the suburbs, — even if they had the justification that the future increase of population would furnish occupants for their new houses.

In our opinion, the city of Boston has, in voting nearly four millions for the new outfall sewer, done something very like this. The suburban area may have been covered with squatters' shanties which might become the starting-point of conflagration; and to this modified extent there would be a certain advantage in replacing them with safe buildings. But the course which would naturally suggest itself would be, to make the houses in the city itself fire-proof. If the chief source of an insanitary condition were as well recognized as the danger from fire, the natural course in this case also would be to strike at the root of the evil at once, — not to adopt an elaborate and expensive scheme for disposing of sewage which has already worked its chief harm, and whose further effect (in the case of Boston at least) is rather nasty than dangerous.

We by no means under-estimate the importance of a good outlet for our foul drainage; but we think the first care should be given to the thing to be let out.

It is speaking within bounds to say that of all the houses in the best ward of Boston, not one in fifty is free from defects in its interior drainage which would become a serious source of danger on the outbreak of an epidemic of cholera or of typhoid in the district traversed by the sewer with which it is connected. It is safe to say also, that no single sewer in the whole city is so arranged, as to ventilation, cleansing flow, and free outlet, that it would not, in the event of its receiving the dejections of cholera or typhoid patients, become a transmitter of infection throughout its whole district. Not that in any case all the inhabitants of the house or the district would be attacked, any more than that all the men in line of battle are shot down. We withstand the assaults of infection wonderfully well; but those who die from infectious diseases die because they are exposed to infection, just as soldiers are shot down because they go into battle. If there is a controlling argument in favor of the new sewer, it is surely the sanitary argument. If the sanitary argument is to control, it should secure the most efficient use of money spent for the improvement of the public health. So far as the public health is concerned, each hundred dollars judiciously spent in improving local sewerage and house drainage within the city would do more good — present and prospective — than any thousand dollars spent on this outlet sewer. The foul air by which the people are being poisoned comes far more from ill-arranged and unventilated soil-pipes, house-drains, and branch sewers, than from the sewage deposits on the outskirts of the town, however offensive these may be. It is not the stink that kills; the effluvium from rotting sewage deposits on our embracing mud-flats may well turn the stomach, but it is rarely formed so near to dwelling-houses as to become a real source of disease. One would be safer from the attack of zymotic poison living in a shanty on the edge of our worst marsh, than in the most luxurious bedroom on Beacon Hill, with a stationary wash-basin at one's bedside.

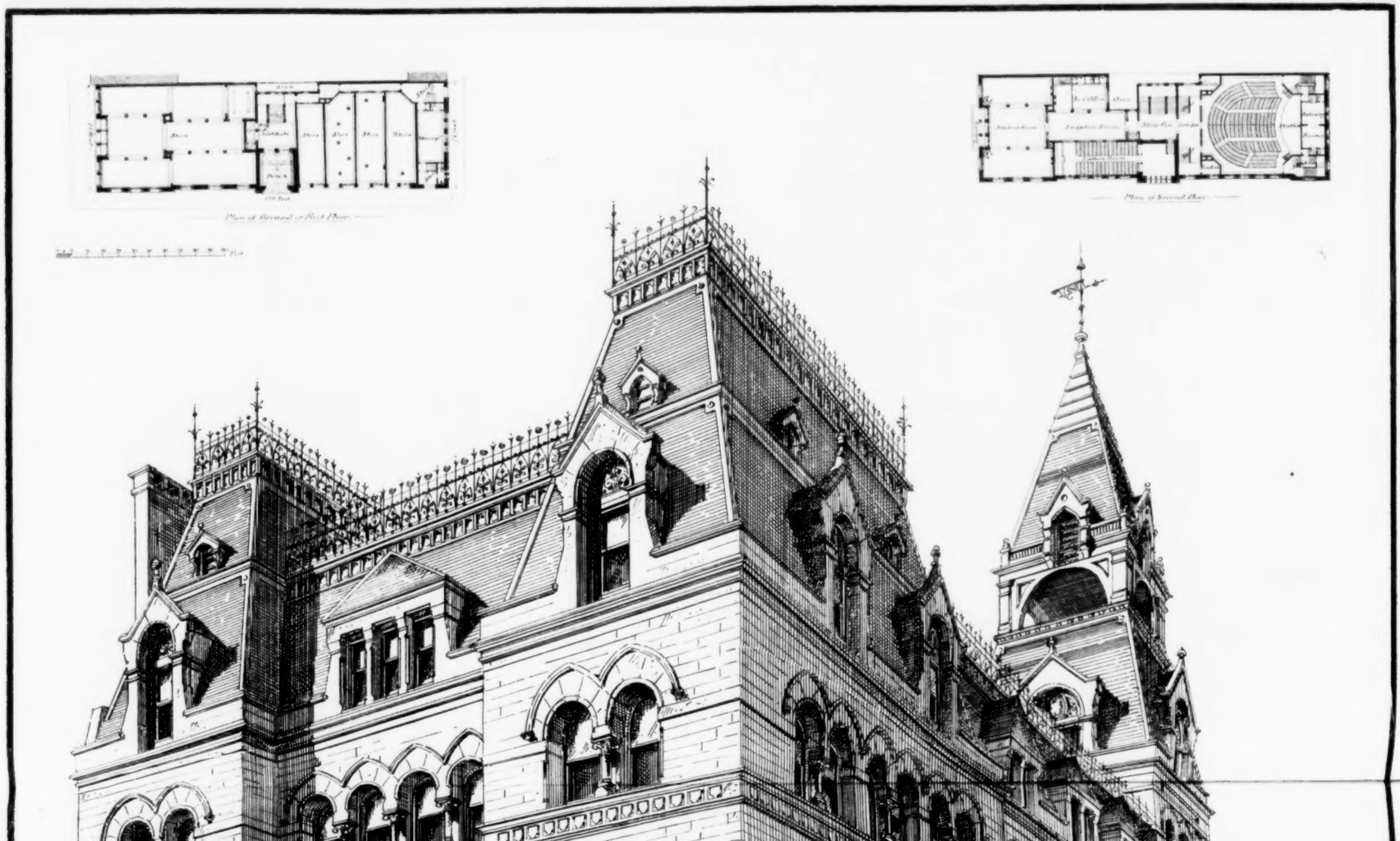
The first step in the improvement of the public health by drainage is to make sure that while the foul water runs away, sewer-gas shall have no chance to invade our houses; the next is to see to it that neither in the waste-pipe of the house, nor in the private drain, nor in the public sewer, shall poisonous sewer-gas be formed. The accomplishment of all this is easy. It is only a question of intelligent attention to important details, — details of design and of execution. It is here that the city authorities should begin their work, and here they should stick until no single house in the whole city, public or private, is in any thing less than a perfect sanitary condition, and until each drain and sewer is as good as it now is bad. This being done, and all *local* sources of disease being removed, then they may very well turn their attention to some scheme looking to the distant discharge of the sewage of the city. Whether it will be worth while, for a century to come, to go so far as Moon Island, may well be doubted; and it is more than likely that, long before the necessity would arise, we shall have found means for turning the fouler outflow to good agricultural account.

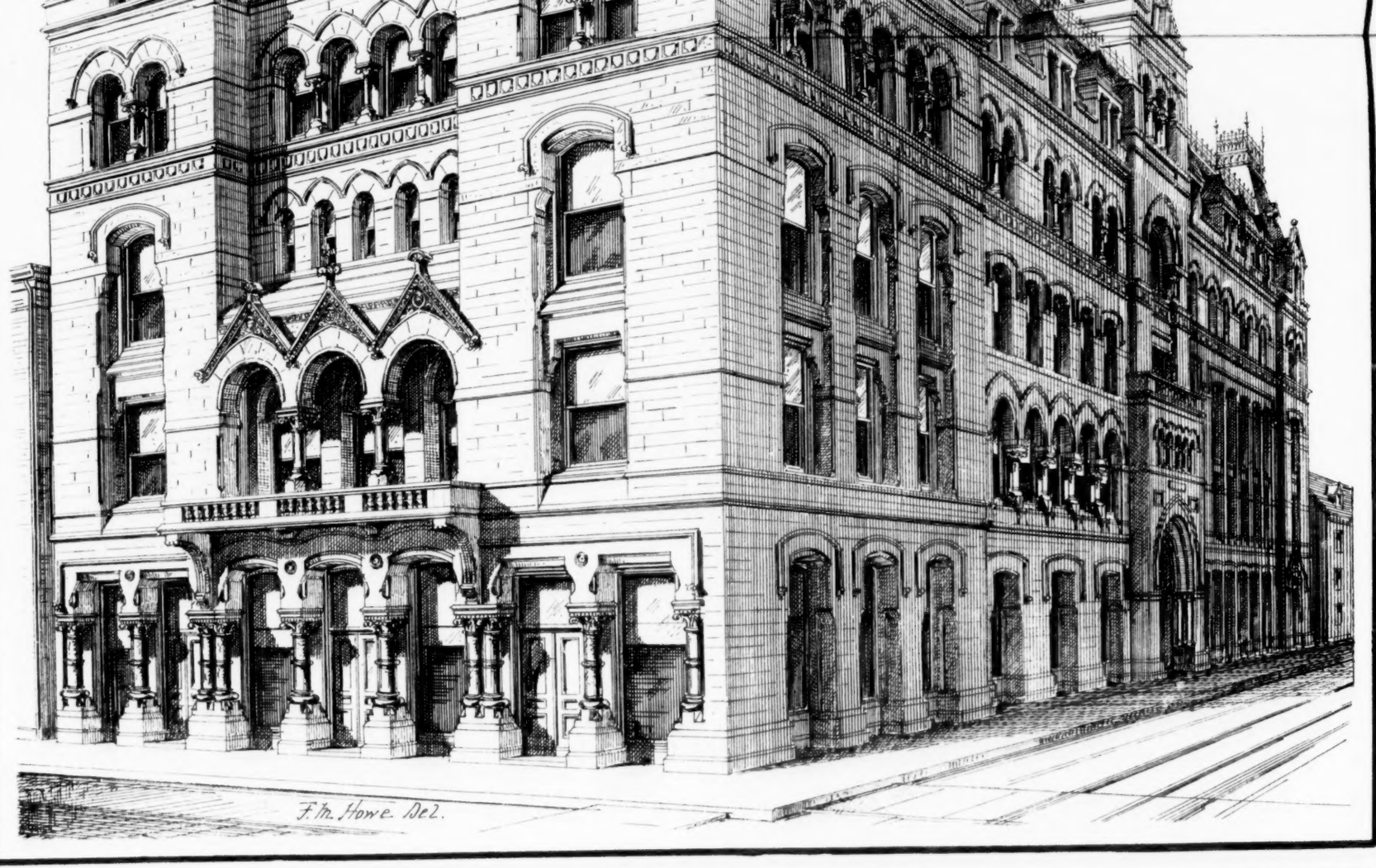
When we consider the exact degree to which the present discharge of filth into the harbor has affected the health of the city, we may almost question whether the sewage might not be delivered for a century to come at Old Harbor Point, without creating a serious nuisance. That offensive smells arise from fouled mud-flats in the *immediate* vicinity of population, is of course true. The degree to which these smells affect public health is not determined; and no sanitarian would consider it an excessive statement to say that for every case of illness arising from this cause, at least twenty cases arise from bad sewerage in the streets, and bad drainage in the houses. If the value of real estate in the neighborhood of Old Harbor Point and Savin Hill would be affected by discharging the sewage directly into the harbor, near the pumping station, the loss from this source would be trifling as compared with the cost of the proposed tunnel alone; and there can be no question that any effluvia arising here would be so diluted before reaching even the nearest part of South Boston, as to be harmless, if not imperceptible.

In our opinion, there are a good many things to be thought of before making an appropriation of $4,000,000 for a work whose uncertain future might remind us sadly of the State's investment in the Hoosac Tunnel, which was also a grand engineering scheme in an equally untried field. If its future could have been foreseen, it would never have been undertaken. Twenty years hence we may wish we had not undertaken the Sub-Neponset Tunnel.

[1] Report of the Joint Special Committee on Improved Sewerage, July, 1877.

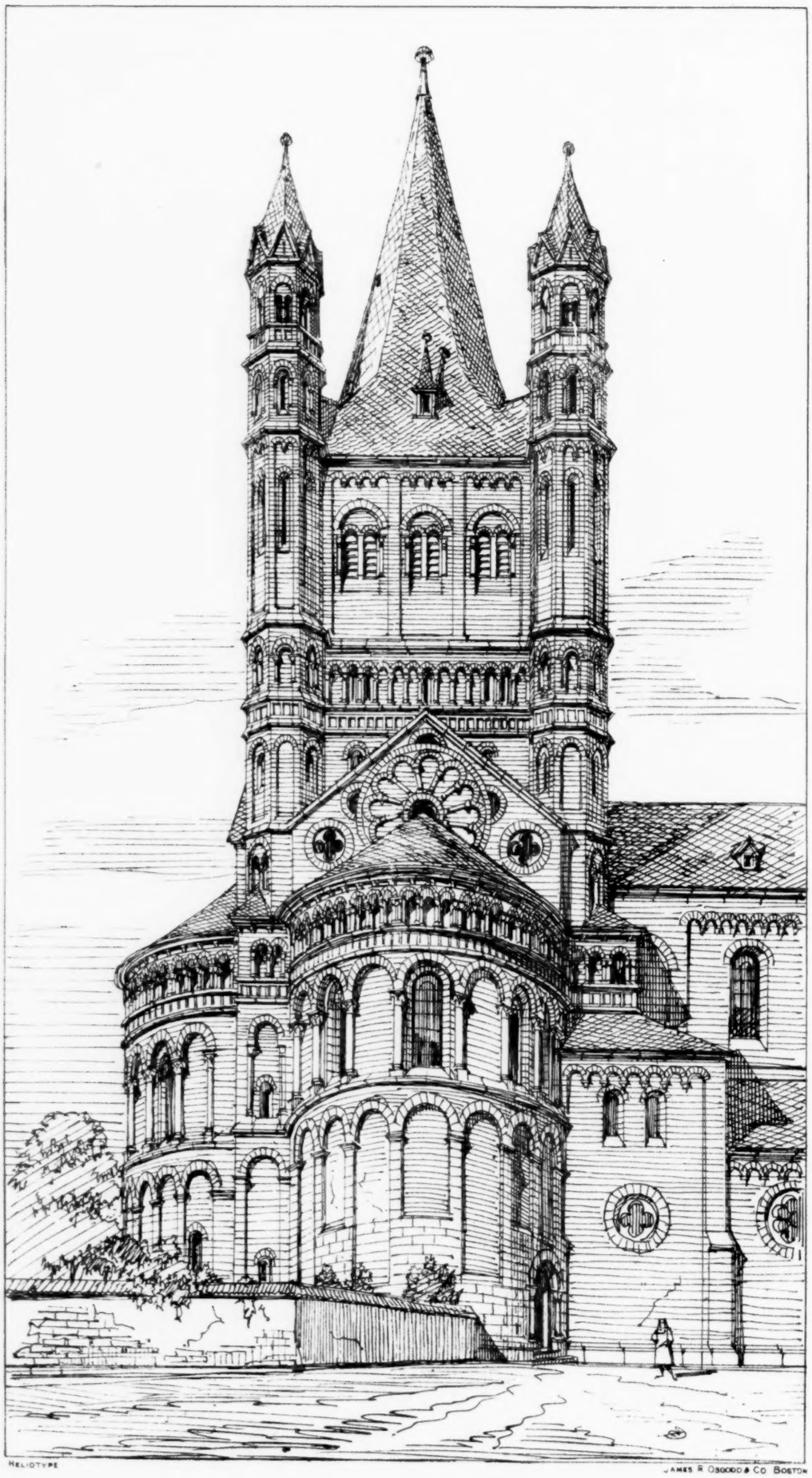
BUILDING OF THE Y. M. C. ASSOCIATION.
PHILADELPHIA.





ADDISON HUTTON, ARCHITECT

JAMES R. OSGOOD & CO. BOSTON



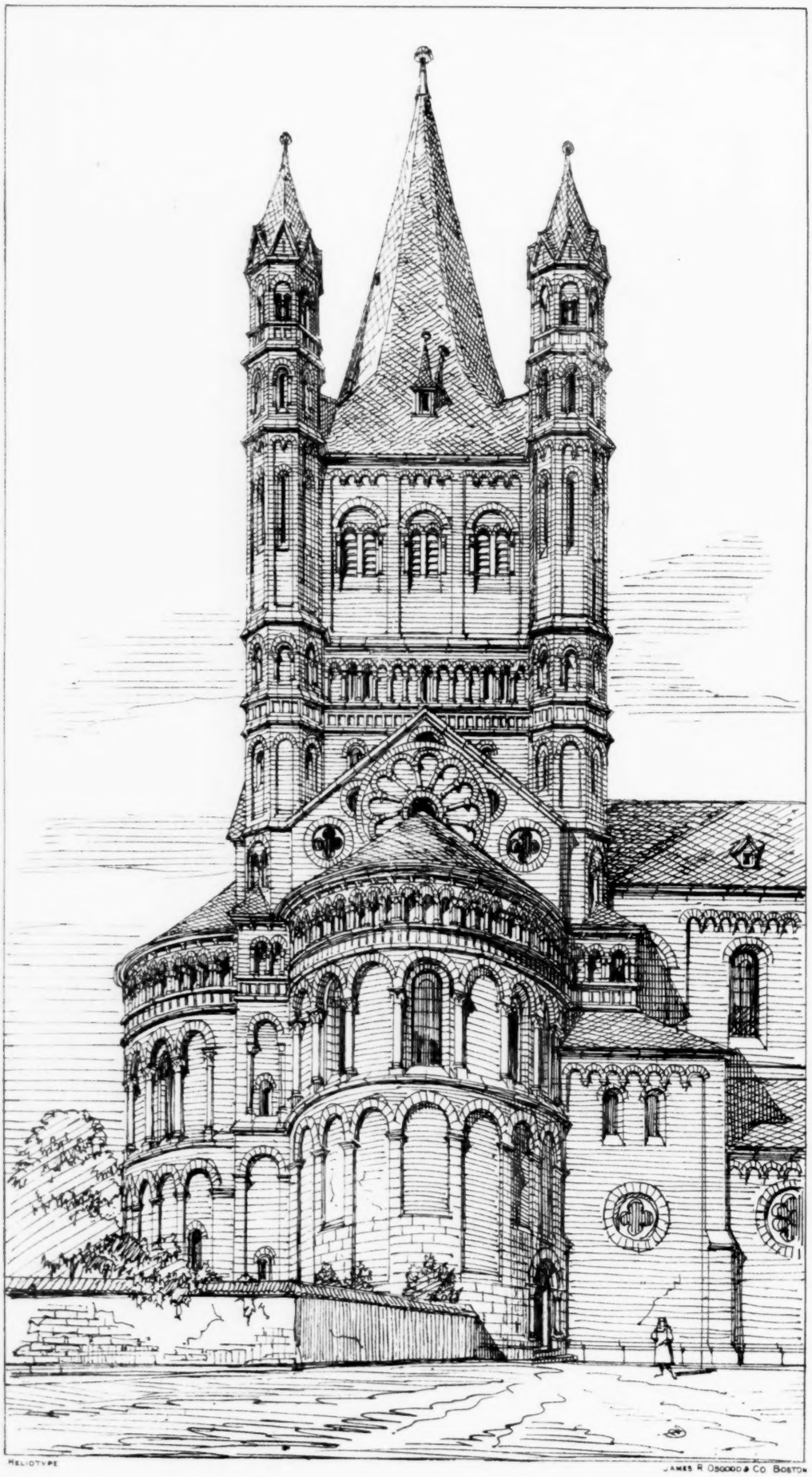
Grote St. Martin at Cologne.

Chapel at Englewood, N. J.
Potter & Robertson, Architects.
52 William St., N.Y.

H. EDWARDS FICKEN, Del.

HELIOTYPE

JAMES R. OSGOOD & CO. BOSTON



Groß St. Martin at Cologne.

H. EDWARDS FICKEN, Del.

HELIOTYPE

Chapel at Englewood, N. J.

Potter & Robertson, Architects.

52 William St., N.Y.

JAMES R. OSGOOD & CO. BOSTON

Some pumping system is essential to the proper sewerage of the made lands of the city; but this is a very different affair from pumping the whole drainage of fifteen square miles of city and country, and it may be simply and cheaply accomplished.

Another consideration should not be lost sight of: All or nearly all of the houses on the new lands are built on piles, which were driven with reference to the present level of water in the soil. Mr. Richardson, for example, has piled nineteen million pounds of masonry on the heads of the piles which support the tower of Trinity Church. "As an excess of precaution against any failure of water for keeping the wood saturated," he cut off the piles at "grade five." The proposed new sewer is fixed (at Tremont Street) ten feet below this grade; and presumably, as this is one of the lowest parts of the town, it is in contemplation to carry the drainage far below the heads of these piles. Then what?

THE ILLUSTRATIONS.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, PHILADELPHIA, PENN. MR. ADDISON HUTTON, ARCHITECT.

(215 South Fifth Street, Philadelphia, Penn.)

THE new building for the Young Men's Christian Association has a front of 72 feet on Chestnut Street, the same on Sansom Street, and of 230 feet on Fifteenth Street; it is five stories in height including the mansard roof, and has a basement story, together with vaults under the sidewalks ten feet clear depth. The first story is divided midway on Fifteenth Street by the entrance (25 feet wide) and staircase to the upper stories. The northern portion to Chestnut Street front is divided into three stores of 24′ x 100′, and the southern part into four stores fronting on Fifteenth Street. The second story contains, on the north, the secretary's rooms, a large reception-room, a prayer-room, and a reading-room and library, extending through two stories; on the fouth, the Association Hall, with two curved galleries, and two stairways to Sansom Street. The seating capacity is 1,300; the seats are upholstered chairs. There are a few rooms on the third, fourth, and fifth floors to be let as offices. A feature worthy of remark on the fourth floor is the gymnasium, which occupies the breadth of the front by 40 feet in depth, and extends in height into the fifth story. Being placed over the reading-room, great pains have been taken (and with marked success) to deafen the floor. This is done by covering the counter flooring with about two inches of calcined plaster mixed with sawdust. The Association Hall has proved a perfect success with regard to sound, and is much sought after for musical purposes. All the walls are brick, but the three fronts from base to cornice, and including the latter, are faced with Ohio (Amherst) stone, square drove. The base is Quincy granite, and the shafts throughout of polished Scotch granite. The interior is finished mostly with shellacked cypress wood, except the stairs; some of these are ash; the main stairway is oak. The sashes and shutters are generally of walnut; the store doors and window frames are of mahogany. The ceiling-light and windows of the Association Hall and of the prayer-room and main stairs are rich with stained glass. All other principal windows are filled with polished French plate-glass. Steam is used for warming the building by direct radiation; and the ventilation is aided by steam-coils, placed in four large ventilating stacks. The boilers, placed under the sidewalk, afford the power for running a passenger-elevator, which plies from the first to the fifth floor, and also for pumping the water to a 5,000-gallon reservoir in the tower, which supplies the greater part of the building. Electricity is called into play in lighting up the Association Hall, and is found to serve the purpose in a most satisfactory manner.

CHAPEL AT ENGLEWOOD, N.J. MESSRS. POTTER AND ROBERTSON, ARCHITECTS.

(52 William Street, New York, N.Y.)

This chapel, now building, adjoins the Presbyterian Church at Englewood, N.J. The walls are of a local red sandstone, laid up in rock-faced ashlar, with finish of a similar stone of lighter color. All caps, carved panels, and diaper-work are of Ohio stone, the sandstone being too coarse in texture to admit of carving. The plan embraces a chapel seating 325, two parlors, an infant-class room, together with pastor's and librarian's rooms. The windows will be filled with rolled cathedral glass in geometric patterns. The interior will be decorated. Estimated cost $18,000.

THE CHURCH OF GROSS ST. MARTIN AT COLOGNE.

The Church of Gross St. Martin near the Rhine was consecrated in 1172. It is Romanesque in character, and is generally spoken of in connection with the two other churches of the same period at Cologne, — St. Maria im Capitol and the Apostelkirche, of which Fergusson says, "Among buildings on their own scale they are as yet unequalled." But he also says of this one, "it has more of the aspiring tendencies of the pointed style, and though very elegant, its apsidal gallery is too small, and the whole design is somewhat wire-drawn." The massive tower, one of the corner turrets of which is still unfinished, rests upon four arches of one hundred feet rise and forty feet span; these are counterpoised by three half-domes. The lower part of the church was built nearly a century later, and belongs to the transition period. Near the entrance is the font, which is decorated with lions' heads and foliage; this is by some thought to belong to the eighth century, and by others to be a tub from a Roman bath: in either case it was presented to the church by Pope Leo III. at the beginning of the ninth century. The illustration is taken from Dollinger's *Architectonische Reise-Scizzen aus Deutschland, Frankreich und Italien*, published at Stuttgart.

CORRESPONDENCE.

THE POST-OFFICE. — STORES. — THE KENSINGTON BANK BUILDING. — THE RIDGEWAY BRANCH OF THE PHILADELPHIA LIBRARY.

PHILADELPHIA, Aug. 16, 1877.

AFTER nearly four years of work on the foundations of the new Post Office, during which the powerful derricks have been all that was visible to the public, it is very gratifying and encouraging to see the work rising above the high fence enclosing it. The granite work of the first story of the front on Chestnut Street, and about one-quarter of that on Ninth Street, will this week be completed to the top of the first entablature. The granite is dark and very even in shade, and the cutting of the ornamental work appears to be very well done.

West of this, in the same block, Mr. Sims is putting up a store-front in brick and Ohio sandstone. The first floor has four heavy chamfered stone piers, supporting deep brick arches; the central and widest of the openings will be the store window, the entrances being on either side, which are to be closed with iron grills. The story above this has a large oriel window of timber-work, with gabled front supported on wooden brackets, which rest on stone corbels standing out from the central piers. The red brick-work of this and the stories above is relieved with courses of incised sandstone and colored enamelled brick of the Excelsior Company. The cornice, supported on machicolations of brick, is of sheet metal, with very little projection.

Struthers & Sons, the well-known stone masons, have vacated their old-time place of business on Market Street, and opened their offices in a Walnut-street house, to which they have added a very effective front of Connecticut brown stone and red brick; the former, very decidedly predominating, is elaborately carved in medallions and string-courses in high relief. The third floor is run up into a double pair of gables, between which the dormer is hooded out from the roof.

Just above Broad Street, on Chestnut, on the lot adjoining the effective corner building which was put up about eighteen months ago from Mr. Williamson's plans, two stores are in progress from the same architect's designs. The upper floors are supported on heavy fifteen-inch iron girders, which are revealed and ornamented with large rosettes. The divisions of the lower story are carried out in timber work. The upper stories are of red brick with Ohio sandstone trimmings. Much of the brick is laid angle-wise to the face of the wall, so that what are usually flat wall spaces present a great deal of light and shade.

The new building of the Kensington National Bank at the south-west corner of Frankford Road and Girard Avenue is from drawings by Mr. Furness. The building occupies a lot 48′ x 52′. The entrance being on the corner, the angle is cut off very much in the same manner as was done with the Centennial National Bank building opposite the Pennsylvania Railroad Depot on Market Street, West Philadelphia. A small balcony over the door, supported on heavy corbels, is the only feature of prominence, the mouldings and cornices having very small projections. The windows on the sides of both stories are in pairs, and quite broad, giving ample field for some very spirited wrought-iron work. The material of the building is granite, the pilasters and quoins having rock face. In the interior, besides the usual bank furniture, the officers' and other rooms are partitioned off on either side of the central block formed by the safe; the second floor being very little more than an iron gallery running all around, supported on perforated plate-brackets of the same material. The ceiling is dome-shaped, entirely of iron, supporting a large skylight. The iron panels of the former will be picked out in gold and colors.

Mr. Furness has also under way a building intended as an adjunct to the Jefferson Medical College on Tenth Street above Walnut. The building will be very plain, but a rather bold combination of materials. It will be of three stories, and is to be used for the private rooms of the faculty, chemical and other apparatus. The first story of the front will be of iron, above which the horizontal portions of the building will be mainly of granite, and the perpendicular supporting masses of brick.

The Mercantile Library Building, which was damaged by the fire which destroyed the adjoining theatre, has been repaired. The most noticeable improvement which has taken place is the interior painting of the walls and ceiling, the bold stencilling and color-decoration of which have been directed by the same architect.

The work of rebuilding the theatre on Chestnut Street has been actively commenced.

The large building erected in compliance with the will of the late Dr. James Rush on the block bounded by Broad, Thirteenth,

Carpenter, and Christian Streets, is at last completed. The provisions of the will were very peculiar, and the building is in many respects equally so. Intended for the use of the Ridgeway Branch of the Philadelphia Library and also as a mausoleum for Mr. John Jacob Ridgeway, his daughter Mrs. Rush, and Dr. Rush, it is offered to the Philadelphia Library Company by the executors, provided it shall remove into the new building from the one now occupied on Fifth Street south of Chestnut. Exteriorly the building is of granite in Grecian-Doric style. The Broad Street front, 122 feet in length, has three porticos of equal height, the central pediment supported by eight, and those on either side by four, fluted monolithic columns. All the columns being of equal length, has the effect of making the side-porticos appear higher than the central one. Almost the only carved detail of the exterior consists of certain very clumsy and badly-designed floriations, which occur in the pediments, and had better have been entirely omitted. The roof is of beton, supported by a corrugated iron construction; in the beton are laid strips of wood to which the tin covering is fastened. The interior shows the central portion of the building given up to a large hall, around which on the first floor are officers' rooms, directors' rooms, etc., while immediately facing the entrance, and lighted by a wretched little stained-glass window, is a small room which will contain the commemoration stone. The space above these rooms forms a gallery, and the ceiling (this portion being entirely lighted by skylights) is supported on massive pilasters and Roman-Doric columns of the lightest cast iron. The entablatures and all the upper decorative work of cornice and ceiling are of stamped and cast zinc, which has been painted in a manner that shows more acquaintance with the works on the modern German classic revival than any feeling for the fitness of certain colors for certain places. The floors and main stairways, as also the entire entablature which finishes the edge of the gallery, and all the doors and their frames, are of oiled oak or ash. One would have supposed from the appearance of the exterior of the building and its history, that the floors and stairways would have been of stone or tile; although as to the matter of security against fire, the isolation of the building is its best security. The north wing of the interior is fitted up with light iron stairs and galleries and cases for the reception of books; and the south wing will be used as reading-rooms on the first floor, and on the second floor the rooms will be devoted to the library and some of the *penates* of the persons the work is to commemorate.

The call for plans issued by the commission appointed to select a site and erect a new Hospital for the Insane for the South-east District of Pennsylvania, is a most extraordinary piece of English composition. Indeed, it is no easy matter to understand what is called for and how the architects are to be dealt with. In the first place, the resolutions read very much as if all the drawings submitted were to be held for the use of the commission. There seems to be some confusion in the minds of the members of the commission as to the value of the terms "plans" and "elevations," as they refer to "a general ground plan" and "a plan in elevation." An isometrical perspective, although it is pretty evident that that is what the commission want, is not mentioned.

During the month of July there were issued by the Building Inspectors permits for 482 new buildings and for 119 alterations and additions.

MARBLE FRONTS. — THE PEABODY INSTITUTE. — CHURCH OF ST. MICHAEL AND ALL ANGELS.

BALTIMORE, Aug. 14.

THE summer here has been characterized by the usual amount of cheap contract work in the way of numerous rows of dwelling-houses in all the new portions of the city, moderate sized, badly planned, and badly built. In one respect only has there been an improvement in this class of work; namely, in the very extensive use of Baltimore County white marble for the fronts of these houses, in place of the formerly almost universal pressed brick with white "trimmings." As many as fifty of these houses are now in course of erection in the north-western section of the city alone. The best effect in this style of work is obtained from a rough tool finish, the courses laid in broken range, with dressed lintels and sills: a certain amount of carving in relief also appearing in many of the designs. Although few of these houses are above mediocrity in architectural design, they have made a very decided step in advance of the old stereotyped front, and show a certain amount of thought and study, and open the way for much more.

The vicinity of the Washington Monument is at present undergoing a very marked change in the improvement of the two squares of Washington Place which till now have been blank parallelograms of grass, carefully protected by high and massive iron railings in the most funereal style, but without even the addition of a tombstone to give them any interest. They are now stripped of their railing, and are being transformed into terraces and flower-gardens, adorned with statuary, fountains, and ornamental lamps, after the designs of the architect of Central Park, at a cost of $18,000. The two similar squares at right angles to these in Mt. Vernon Place are only awaiting the necessary funds to be embellished in like manner.

Another very decided improvement in this portion of the city is the completion of the Peabody Institute after Mr. Lind's design. The west wing of this building has been completed and occupied as a library and music and lecture hall for several years. Ninety-eight feet have now been added, making the building complete and symmetrical, according to the original design, in smooth dressed white marble, modern Italian classic in style. The interior gives a library measuring 84′ x 70′ x 57′, which will hold from 250,000 to 450,000 volumes, arranged in six galleries of alcoves, each 8′ in height. There is also a lecture and music hall measuring 100′ x 66′ x 40′. The former library and reading-room are arranged *en suite* with rooms in the new building, and form a group of art-galleries. The building is fire-proof, the floors formed of iron beams and girders, filled in between with Tiel blocks, as are also the bays between the roof-rafters: the partition walls are either of brick or Tiel. All the interior finish is of cast iron. Black and white marble tiling is used throughout.

Mr. Lind has also designed the large cast-iron front for a warehouse which is about to be built for Messrs. Armstrong and Cator on Baltimore Street.

The congregation of the church of "St. Michael and All Angels" recently obtained drawings in friendly competition from five architects for a new church which they intend shortly to build. From this number the design of Messrs. Wyatt and Sperry was selected. This design shows a building 122′ x 100′, perfectly cruciform in plan, without columns or any interior obstruction to a view of the chancel. The material to be used will be "Falls Road blue stone." The style is somewhat Norman, round arches alone being employed, and the effects gained rather from broad, simple masses than detailed ornamentation. A tower and spire 170 feet high is placed in the angle of the nave and transept. The estimated cost of the completed building is about $80,000, but only a portion, consisting of the two transepts, is to be built at first.

Messrs. Wyatt and Sperry have also on hand a large frame country residence for Mr. Joseph Hopkins in Baltimore County; and a swimming-bath, consisting of a pool 40′ x 20′, and 5′ deep, with dressing-rooms, etc., the whole treated in an ornamental rustic style in stone and wood, at the country-seat of W. H. Perot, Esq.

ARCHITECTURAL DICTIONARIES.

WESTERLY, R.I., Aug. 13, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Can you by letter, or through the columns of the *Architect*, give me the names and cost of the best architectural dictionaries or encyclopædias now in use? also the names of the author and publishers, and the address of the place where the books may be purchased. Very truly yours,

J. IRVING MAXSON.

[WHAT promises to be the largest general architectural dictionary is that of the Architectural Publication Society of London, now carried as far as the letter O. Gwilt's Encyclopedia of Architecture (Papworth's edition) covers the subject of which it professes to treat very thoroughly, and is probably the best work of its kind in English. Parker's Glossary of Terms used in Grecian, Roman, Italian, and Gothic Architecture, is regarded as the highest authority in England with regard to English mediæval work (John Henry Parker, Oxford, England). Viollet-le-Duc's *Dictionnaire Raisonné d'Architecture Français* covers the same ground with respect to French mediæval work, but in a manner far more exhaustive. Rosengarten's Architectural Styles, published by D. Appleton of New York, although not a dictionary, may prove useful in explaining the more general terms. The Paris publishers, Firmin Didot & Cie., are now issuing in parts the *Dictionnaire Raisonné d'Architecture et des Sciences qui s'y rattachent*, by M. Ernest Bosc. In German, Lübke's *Geschichte der Architektur* may be read to advantage, although more strictly a history. Herr Mothe's new *Baulexikon* in three volumes, copiously illustrated, is also highly spoken of. The older works of Nicholson, Stuart, and others of London on this subject are now out of print of course, and out of date in many respects, but may be picked up cheap at second-hand bookstores. The Dictionary of Terms, published by John Weales of London in his well-known series of technical papers, is inexpensive and useful. The prices of these works may be best obtained from any good book agent or publisher. — *Ed. American Architect.*]

DID BISMARCK KNOW? — The Emperor of Germany has given 9,000 marks and 2,000 kilogrammes of gun-metal to the new Roman Catholic Church of Ems.

BLACK MORTAR.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

FOUNDRY sand is sometimes used for making black mortar: I believe the Government employs it in preference to other methods.

T. M. C.

THE MASONIC TEMPLE AT NEW HAVEN.

NEW HAVEN, Aug. 15, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

IN the Aug. 4 issue of the journal, under the head of a brief entitled "Good Workmanship," appears the following: "It is said that the Masonic Temple at New Haven, which has been built but five years, has been declared unsafe, the walls being far from perpendicular." By a recent vote of the aldermen, the owners have been notified to make certain precautionary repairs in accordance with recommendations of the commissioners of public buildings. The walls, it is true, are out of perpendicular, but not over three and a half inches, as a maximum, in the whole height of seventy feet. The thickness of the walls is 20 and 16 inches.

In justice, however, it should be said that other and combined causes led to the recent investigations. The building was erected in the usual modern haste. The joists and other timbers were, from *necessity*, ordered direct from the lumber regions, where they were sawed, then shipped, and placed in the building wholly unseasoned. To their subsequent shrinkage a large percentage of the visible defects is due. The remaining causes are owing variously to slight deflections of a few girders and to concussions from marching on the armory floor. This marching, it is believed, can be continued with perfect safety after the introduction of a few additional ties and the possible substitution of iron girders in place of the present deflected wood and iron combination girders.

J. W. M., *No. 5 Masonic Temple.*

THE CATACOMBS.[1]

THERE are few subjects on which more extreme opinions are entertained on both sides than the catacombs of Rome. An archæologist has nothing to do with any theological question; but the catacombs belong really to archæology more than to theology. The question of the dates of their construction, and of the fresco pictures, are questions of fact, not of theory, and must be decided like other such questions by the principle of comparison. Persons who have studied the history of the art of drawing can see the date of a picture at a glance, just as one accustomed to the study of architectural history can see the date of a building. There is no doubt that the catacombs were the general burial-places of Rome for three or four centuries, for all those who had not family tombs by the side of the roads. All the space allowed for tombs on the roads had been occupied during the seven hundred years from the foundation of Rome to the Christian era, which is also the beginning of the Empire; and it is clear that some of the catacombs are of the first century, as is shown by the construction of the walls and the architectural details, where any can be found. This is especially the case with the very large and important one of Prætextatus, where some of the brick walls are distinctly of the time of Nero (there is no mistaking the long thin bricks of his time, which are found in all the buildings known to be of that period, and in no others). They continued to be used as burial-places until the sixth century. In the seventh they were so much damaged in the siege of Rome by the Lombards, that the ecclesiastical historian says "they annihilated the catacombs." After that time, when Charles the Great came to Rome, at the end of the eighth and the beginning of the ninth century, there was a general revival of the building of new churches and restoring of old ones; and it was the same in the catacombs: great restorations were made at that time, but no new ones were made. They were so far restored as was necessary to encourage pilgrimages to them in the ninth century (and the same has been done again in the nineteenth!) The most remarkable buildings connected with them are the chapels at the entrances to them, for the burial-service. At first these were underground, but close to the entrance. After "the peace of the Church" had been declared by Constantine, they were built above ground, near the entrances, of which there are many remains more or less perfect, especially at that of Prætextatus. There were several ways into this very extensive catacomb. One of them seems to have been from a subterranean road between the Church of St. Sebastian and St. Urban, in the district called by the name "of the Catacombs." It is close to the circus of Maxentius, and the tomb of his son Romulus, which is called *ad Catacumbas* by the contemporary historians. But as these burial-places are older than the time of Maxentius, the district may have been named from them, and not they from the district. This is the valley under the hill on which the great tomb of Cæcilia Metella stands. The Church of St. Sebastian also stands in it. This was originally called *the* Catacomb, because the entrance to many of them in that district was through that church. But the name is quite mediæval; that used by Anastasius and all the early writers is *cemeteria*. The earliest pictures are in the subterranean entrance-chapel of Prætextatus, where the vine is painted on the vault, and spread all over it, and is of the second century. On the wall of this chapel was a Good Shepherd; and the Roman Catholic antiquaries claim this as a proof that this catacomb is exclusively Christian from the beginning. But those who have studied the history of painting could see that the Good Shepherd was quite of a different class of art from the vine, and more probably of the fourth century. (I am sorry to say that this picture of the Good Shepherd has been destroyed in some repairs made about 1875.) Those who are at all acquainted with the catacombs will not need to be reminded of the very narrow passages called *corridors*, or *streets*, with the *loculi*, or graves, cut in the tufa walls on each side; nor of the numerous steps down into them, and the variety of small vaulted chambers called *cubicula*, one of which is frequently the burial-vault of a family. Many of these chambers of the fourth and fifth centuries have columns at the angles, with capitals and bases, and seats, with side-boards, all cut out of the tufa. The very large catacomb of Prætextatus was certainly not exclusively Christian: there are distinctly Pagan subjects in one of the chambers at the foot of the steps of one of the original entrances, and these are of the third century. In another chamber, or *cubiculum*, very near to this, the subjects are Christian, of the fourth century, apparently because the family had then become Christian. The burial-place of the worshippers of the Persian god Mithras is almost, if not quite, a part of this great catacomb, which is on the Via Appia, about two miles from Rome, at the corner of the cross-road that leads past St. Urban's. (If excavations could be made there, they would settle some long-disputed questions.) The principal catacomb, or burial-place of the Jews, is also very close to this. Parts of this are of the first century, others of the fourth. The inscriptions and emblems in this are of special interest. (I am sorry to say that an Englishman purchased of the late Jew owner some of the most interesting and important of these emblems, and carried them off to his private museum in England, where they are of comparatively little interest. In their original places they were historical.)

The catacomb of St. Priscilla is considered by the Roman Catholics as the most interesting for the frescoes, which they consider as very early; some writers have even said they are as far back as the first century. Great stress is laid in particular on the chapel called the Capella Græca, which is in the form of the Greek cross, and may probably be of the third century, at the time that two of the bishops of Rome were Greeks, and there was no difference between the Greek and the Roman Church. Whether any of the frescoes of Christian subjects are really before the time of Constantine, is very doubtful. One small picture on the soffit of the arch of an *arco-solium* (or niche for a sarcophagus), which is about two feet square, and represents the Blessed Virgin, with a star over her head, and with some one addressing her, called "the Prophet of Bethlehem," is said by the Roman Catholic antiquaries to be very early. If compared with the frescoes in the painted tombs on the Via Latina, which are dated by brick-stamps in the walls, as of the third century, it seems hardly possible to imagine that any of the paintings in the catacombs can be of the same period. The drawings of them are very inaccurate when made out by modern artists: the photographs are the only really accurate representations of them. In this catacomb is another celebrated picture, that of the wine-barrels, to which various symbolic meanings are attached. It appears to me to have been the burial-place of the wife of a wine-merchant, and an inscription that was under the picture when my photograph was taken seems to agree with this; but this inscription has since been removed by the authorities. Another interesting picture is said to be the "Woman of Samaria at the Well;" and this seems probable. In very many of the catacombs there are figures in the Oriental attitude of prayer, erect, with the hands uplifted. Sometimes they are at the four corners of a vault, supporting a central picture, perhaps the head of Christ, or the Good Shepherd. In other instances the *orante* is addressed by others. The *orante* are supposed to represent the persons interred, and many of the groups of figures are believed to be family groups. There are also many representations of feasts, which some call *agapæ;* others, the Last Supper of our Lord. Some are evidently family burial-feasts, according to the well-known custom of the ancient Romans. The history of Jonah was a very favorite subject, with all parts of the story: sometimes he is being thrown overboard to a sea-serpent (which is the Vulgate version of what in the English version is translated a whale); sometimes he is under the gourd. We know by illuminations that the history of Jonah was a favorite subject with the artists in the fifth and sixth centuries; and some of these catacomb-pictures are of that period. The three children in "the burning fiery furnace" is another very common subject; also Moses striking the rock, Daniel in the lions' den, Noah in the ark, represented as a box. The most popular pictures in the catacombs, because the best preserved, are those in the catacomb of St. Pontianus, in the Trastevere on the Janiculum. Among them is the baptism of Christ, the jewelled cross, two large heads of Christ, and three figures of saints standing side by side with their names written vertically. They are painted on a wall that crosses one of

[1] From a lecture delivered by Mr. J. H. Parker at the rooms of the Royal Institute of British Architects, July 12, and printed in the *Builder*.

the corridors, evidently a repair of the ninth century, as the wall on which it is painted is of that period. A comparatively small part of this great catacomb has been restored for the pilgrims. I have crept through a hole in the wall, and have got behind this cross-wall, and found the rest of the catacomb in a state of complete ruin, as left by the Lombards.

NOTES AND CLIPPINGS.

THE ACADEMY OF MUSIC, PHILADELPHIA. — The American Academy of Music, at the corner of Broad and Locust Streets, is undergoing extensive repairs and alterations. Many of the improvements look to securing the safety of the audience and performers in case of fire. All staircases leading to balconies and dressing-rooms have been furnished with hand-rails. An iron fire-proof stairway is being built outside the stage end of the building with communicating doors from the dressing-rooms of the ballet, and all the female artists on that side of the stage. Powerful hand force pumps have also been placed on the stage and in the flies, and provided with hose and all other necessary appliances, in addition to the steam pumps, hose, buckets, and other arrangements already in existence. Above the proscenium is a large iron girder supporting a heavy brick arch, upon which rests the brick wall which separates the flies and "rigging floor" from the auditorium. In the space between the chord of the girder and the brick arch the wooden ornamentation of the proscenium is built. It is now proposed to back this with a furring of woven wire, and cover it with a heavy coat of plaster, so as to make a complete fire-proof division between the auditorium and the stage all the way from the top of the curtain opening through and above the roof.

STRIKE OF QUARRYMEN. — Five hundred quarrymen in the quarries in New Jersey have struck work, and have agreed to refuse to deliver blocks for less than $15 a thousand. The blacksmiths who sharpen the tools for the men complain that if the "right spirit had existed in the quarries, the price of blocks would have been raised long ago." As it is, they say they will not sharpen another tool as long as the quarrymen have any dealings with the present contractors. The quarrymen, in return, state it as their intention to stop work entirely until new bids for blocks shall be received from men who can give security for a faithful performance of a royalty contract; and the blacksmiths have agreed to stand by them, and sharpen their tools on credit if necessary. On the other hand, the contractors think that they have enough blocks on hand to finish existing contracts.

THE NICARAGUA CANAL. — Mr. O'Sullivan, who has always been prominently interested in the proposed inter-ocean Nicaragua Canal, has lately been at the State Department, in Washington, on diplomatic business connected with that enterprise. He says the work will cost $80,000,000, and can be completed within five years. No appropriation will be asked of Congress, but subscriptions opened in all parts of the world. He speaks confidently of the success of the work, the surveys for which have already been made by the United States Government.

ACCIDENT. — As Theodore Gerald, a man forty-five years of age, was engaged, a short time ago, in painting the outside of the cupola of the High School building at Evansville, Ind., he attempted to shift the steeply-inclined ladder upon which he was standing, and caused it to topple over into the street, one hundred feet below. He himself fell headlong through a distance of forty-five feet, and struck the roof within about two feet of the gutter. Fortunately the force of the blow was sufficient to drive his head and shoulders so firmly through the slates and boarding, that his further fall into the street below was prevented. Although terribly cut and bruised about the head and shoulders, he is expected to recover, as, strange to say, the skull was not fractured, and the doctors do not fear serious internal injuries.

A LARGE BLOCK OF GRANITE. — There was recently quarried without the use of powder at the Barre, Vt., granite quarries, for the use of the Oliver granite works at Rutland, a block weighing about six hundred and eighteen tons, — being forty feet long, seventeen feet high, and ten feet thick. This immense stone is said to be perfect in every respect, and is believed to be the largest block of granite ever quarried in the State.

THE KENTUCKY NATURAL BRIDGE. — It is stated that the famous Kentucky natural bridge over Caney Creek, in Elliott County, broke in the centre of its arch, a few days ago, and fell in magnificent ruins.

THE QUEEN AND ST. ALBAN'S ABBEY. — Her Majesty Queen Victoria has departed from her general rule of conduct in the matter of restorations, and has subscribed £100 for the restoration of St. Alban's Abbey, because of its great historical and antiquarian interests.

REBUILDING ST. JOHN, N.B. — The citizens of St. John are forming a loan and mortgage association to raise money in England at a low rate of interest, for rebuilding the city, at least $2,000,000 being wanted.

CHINESE BRIDGES. — It is probable that the Chinese were the inventors of suspension, or, as they are called in China, flying bridges. The use of suspended bridges in China dates back to the Han dynasty, which flourished 1,600 years ago. There still exists in Shen-se a bridge of 400 feet span, which is suspended over a chasm 500 feet deep. Most of these bridges are so wide that four horsemen can ride over them abreast.

AN OLD LONDON GRAVEYARD. — The London *Standard* of Aug. 1 says: "At the Guildhall, Westminster, yesterday, before the Assistant Judge at the Middlesex Sessions, Thomas Bouffler appealed against an order of the Parish of St. Mary, Islington, to demolish premises known as new Bunhill-Fields. Mr. E. J. Jones said he had known the ground for 43 years, and had been proprietor of it. It was closed as a burial-ground in 1853. There were thousands of funerals there to his personal knowledge. The ground was completely rotten. It was a burying-ground before 1802, and had been used for funerals three times over, bodies being buried above those already interred when the coffins became rotten. They were anxious to make the most of the ground, and put the coffins as close to each other as possible. Mr. Bouffler, the appellant, had all the books, and would never produce them. In the register books of the burials in the whole of the ground, there were upward of 6,000 entries from 1802 to 1853. On that particular spot where the houses were built there was room for 90 graves, and they, on an average, put nine coffins in each grave. There would therefore be about 600 or 700 bodies in that part of the ground. In digging for the reception of fresh bodies, if they found coffins at all rotten, they knocked them to pieces. The ground was perfectly honeycombed with bodies and in a state of corruption. Some of the coffins were removed in the night so that the inhabitants should not be frightened by their removal. They had buried from 23 to 25 on a Sunday, and the average of Sunday burials was about 18. On week-days the burials were three or four a day. A great number of burials took place there from the Fever Hospital. The particular spot on which these houses had been erected was not drained at all. The whole of the ground was made up of bones, rubbish, wood, and remains of bodies. When a body was required to be buried, a searching-iron was put down, and if it struck against a coffin, and there was not sufficient depth, then it was withdrawn, and a fresh search was made. Joseph Fursman said that when some coffins were dragged out the men employed were up to their knees in black slush, and stimulants had to be given them in consequence of the stench. The Assistant Judge held that this was not a case that came under the provisions of the Artisans' and Laborers' Improvement Dwellings Act, and quashed the order with costs."

THE ISLAND OF IONA, SCOTLAND. — Forty Scottish kings, two Irish kings, one French king, two Irish princes of the Norwegian race, beside innumerable chieftains and ecclesiastics, are said to have been buried in Iona, Scotland.

GEOLOGICAL DETERMINATION OF DATES. — We mentioned some time ago (p. 138) that M. Kerviler, while making some excavations in the valley of the Loire, had discovered that the annual layers of alluvial deposit could readily be counted, and consequently the age of the deposit could be determined by a simple process of enumeration. Lately Prof. Bertrand has discovered near St. Nazaire, France, the remains of a Gallo-Roman or Celtic harbor in which the layers of alluvial deposit can be counted back for 7,200 years. Each one of these layers is extremely thin, and yet is composed of three subordinate layers, the first of which is of a brownish color, and is evidently the deposit made in the autumn by leaves and other decaying vegetable substances; the next layer is white, and is formed of the chalky deposits that are washed down by the spring rains; and the third is yellow, and is composed of the sandy deposits that are made during the summer.

THE GIBRALTAR TUNNEL. — The project for building a tunnel from Algeciras in Spain to a place between Ceuta and Tangiers in Africa is still alive; its projectors have already raised a considerable portion of the $20,000,000 it will cost, and Spanish engineers are said to be in Marseilles negotiating for apparatus similar to those used in the St. Gothard tunnel.

ART THEFTS. — One of the finest carved ivory tablets of the Nimrod Gallery in the British Museum has disappeared. Thieves have also mysteriously carried off from the Modern Halls of the Brera Palace at Milan a fine landscape by Fasanotti and five other valuable paintings.

A NEW FIND IN ATTICA. — The archæological treasures found in a tomb in the rock at Spata, in Attica, have arrived in Athens. They consist of ornaments in gold, silver, ivory, and a substance resembling glass. They are of the same epoch as those discovered at Mycenæ, but finer.

STRENGTH OF CEMENTS. — The Royal Society of Engineers at Berlin has lately made 3,150 tests of cement mixed with different proportions of sand. Blocks measuring 4″ x 4″ x 2⅜″ which had hardened for ninety days were subjected to pressure with the following results: pure cement, average pressure at which first crack appeared, 4,125 pounds; average crushing pressure, 4,708 pounds. Equal parts of cement and sand, first crack appeared under an average pressure of 3,058 pounds; crushed by an average pressure of 3,527 pounds. One part of cement to two of sand, first crack appeared under an average pressure of 2,375 pounds; crushed under an average pressure of 2,773 pounds. One part of cement to three parts of sand, first crack appeared under an average pressure of 1,849 pounds; crushed under an average pressure of 2,375 pounds.

IMPROVED MORTAR AND ARTIFICIAL STONES. — M. Decourneau attributes the cracks in common mortars and cements to the uncombined quicklime that they contain. In order to neutralize the lime, he uses an *agrégat* composed of a very fine silicious powder mixed with diluted nitric acid. He thus obtains mortars with much greater, more uniform, and more lasting resistance than those hitherto used. The application of his method, especially in the new forts of Paris, has given excellent results, without a single failure. Stone made by his process may be sawed and chiselled like natural stone.